

Menus for Low-Cost Balanced Diets and School-Lunch Programmes

SUITABLE FOR SOUTH INDIA



**NATIONAL INSTITUTE OF NUTRITION
INDIAN COUNCIL OF MEDICAL RESEARCH
HYDERABAD, INDIA**

1984

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MENUS FOR

LOW-COST BALANCED DIETS

AND

SCHOOL-LUNCH PROGRAMMES

COMMUNITY HEALTH CENTRES

Suitable for South India

NATIONAL INSTITUTE OF NUTRITION

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PREFACE TO THIRD EDITION

The booklet entitled **Menus for Low-cost Balanced Diets and School-Lunch Programmes** suitable for South India was brought out in 1958 and has been reprinted several times since then. After this booklet was brought out, the Nutrition Expert Group of the Indian Council of Medical Research has revised the recommended dietary allowances for Indians. The data in the booklet have now been updated in the light of these recommendations.

Also with the changeover to the metric system of weights and measures in the country, which has now gained wide acceptance, the quantities of foodstuffs are given in metric units.

In calculating the cost of the diet, the latest prices prevalent in Hyderabad in recent months have been taken into account.

It is hoped that the booklet will find wide acceptance not only among persons concerned with the implementation of nutrition programmes but also among the general public.

National Institute of Nutrition,

19 March 1977.

S. G. SRIKANTIA
Director.

P R E F A C E

This brochure contains menus for low-cost balanced diets and for school-lunch programmes. It is meant to be used along with an earlier publication of these Laboratories 'The Nutritive Value of Indian Foods' by Gopalan, Ramasastri & Balasubramanian.

The publication concerned itself with the nutritive values of several Indian foods and the broad outlines for planning satisfactory balanced diets. The present effort goes a step further and suggests menus and actual recipes which would indicate the practical ways and means of devising cheap balanced diets. Since a considerable portion of the information gathered by these Laboratories regarding dietary practices pertain to South India, it is but natural that this attempt is confined, in the first instance, towards suggesting menus suitable for South India. Menus suitable for other regions may be expected to follow.

The brochure is divided into two parts. Menus and recipes suitable for adoption at home are dealt with in Part I, while menus suitable for mid-day meal programmes for children in schools are dealt with in Part II. In the formulation of low-cost balanced diets, an attempt has been made to suggest menus which would be within the economic reach of the poor. These menus may not be considered to have fully met the ideal nutrition requirements of a balanced diet but have the merit of practical feasibility in the prevailing economic conditions.

In suggesting menus for school-lunch programmes, an attempt has been made to include menus based on non-rice cereals and protein-rich foods. The object of a school-lunch programme should be not merely to satisfy hunger but also to offset gross deficiencies in the home dietaries of children and to inculcate proper dietary habits. These objectives have been borne in the formulation of the menus for school-lunch programme.

It is realised that within the small compass of this brochure it is not possible to anticipate the diverse problems connected with the provision of balanced diets in homes and schools or to answer the practical questions which the housewife or the practical nutritionist may be confronted with. Constructive criticisms and suggestions aimed at improving the brochure will always be welcome.

The following members of the staff of the Nutrition Research Laboratories have helped me in the preparation of the brochure : Dr. S. C. Balasubramanian, Dr. B. S. Narasinga Rao and Miss Swaran Pasricha.

C. GOPALAN, M.D., Ph.D.

Director

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PART I

MENUS FOR LOW - COST BALANCED DIETS

INTRODUCTION

Investigations carried out in the last few decades have provided information on human nutritional requirements. With this information, it is possible now to indicate what a balanced diet for a normal human being should be. To enable the public to prepare such diets in their homes, it is considered essential to suggest daily menus. In the following pages an attempt has been made in this direction.

The Nutrition Expert Group of the Indian Council of Medical Research has recommended certain dietary allowances for balanced diets. However, diet surveys in different parts of the country have shown that the content of different nutrients in Indian diets is considerably lower than the recommended levels. An attempt has, therefore, been made here to suggest nutritious low-cost menus within the economic means of the majority of the people.

The menus suggested are meant mainly for the lower income groups of people. Modifications in these menus needed to bring them into closer conformity with the recommendations for the ideal diet have also been indicated at the end of this section. These modifications will naturally put up the cost of the dietaries. However, for the higher income groups who can afford the increased cost, these modified menus are recommended.

In drawing up these menus, the following principles have been followed :

As a result of extensive diet surveys, considerable information on the dietary pattern and practices of the population has been collected. In suggesting menus, care has been taken to include mainly foods which are in common use in the locality and which are, therefore, not "foreign" to the people. The recipes suggested are again generally based on the prevalent cooking practices in the community. It is, therefore, expected

that the popularisation of these menus will not involve violent changes in the dietary habits of the people and will, therefore, not encounter significant psychological "resistance". This would mean that the propaganda and nutrition education required will be minimal.

While rice is the major staple cereal of a considerable part of the South, an attempt has been made here to replace a part of the rice, preferably half of it, with wheat, millets and tubers. Recent researches have shown that such combinations, apart from lessening the demand on rice, may also be beneficial from the nutritional stand-point. Different preparations based on wheat, millets and tapioca have also been suggested with a view to popularising the consumption of these foods among the predominantly rice-eating South Indian communities. Emphasis has also been laid on the need for the inclusion of foods other than cereals like pulses, fish, vegetables and fruits. It is further recommended that generous amounts of fish or pulses should be taken whenever tapioca forms the staple food.

Since these menus are mainly meant for the low income group, they have been so framed that the number of courses per meal is minimal and the cooking procedures are simple. The cost per day per adult is about Rs. 1-95.

By providing a number of alternatives in the exchange lists, it is ensured that there will be no tedium or monotony in the diets and there will be reasonable variety.

The menus suggested are for an adult and are based on 425 g cereals, 70 g pulses or fish, 100 g of leafy vegetables, 75g of non-leafy vegetables, 30 g of oil, 30 g sugar or jaggery, 115 g of milk and about 30 g of fruits per day. The calorific value will work out to about 2400 with a protein intake of about 60-70 g per day. All other nutrients will be supplied in reasonable amounts to satisfy at least the minimal requirements.

It may be repeated here that diets suggested above are not necessarily the ideal for the community. However, they could be considered to be the nutritious low-cost diets possible under the prevalent socio-economic conditions.

For persons who can afford the extra cost the following modifications in the menu are recommended. These will provide variety and avoid monotony in the diet. But the cost will work out to about Rs. 2-50 to Rs. 3-00 per day.

The improvements suggested are :

1. Retaining the cereal intake around 400 g.
2. Inclusion of at least one egg per day.
3. Increasing milk from 115 ml to 200 ml for vegetarians; and inclusion of about 30 g of meat or fish for non-vegetarians.

THE DAILY MENU

The daily diet will consist of two principal meals and one light meal taken as snack or breakfast.

Menu for principal meals

One item from each of the exchange lists I, II and III. Include butter-milk (equivalent to about 115 ml. of milk) in at least one principal meal.

Menus for the light meal

One item from exchange list IV. This may be taken with coffee or tea prepared with milk and jaggery.

* EXCHANGE LISTS

For the principal meals :

I. Cereal and tuber exchange

Rice, ragi, jowar, bajra, varagu or tapioca cooked (1) OR Wheat chappati or Roti made from ragi, jowar, bajra, etc. (2).

It is advised that the same cereal should not be used for both the principal meals in the day.

II. Pulse and vegetable exchange with or without flesh foods

Sambhar (3) and vegetable chutney (4) or vegetable soup (5) and pulse chutney (6) or vegetable curry (8) and vegetable "Kootu" (7) or pulse salad (9) and vegetable soup (5) or pulse powder (10) and vegetable curry (8) or Fish curry (11) and vegetable soup (5).

Include daily at least one leafy vegetable like amaranth, mint, agathi, etc , in the vegetable preparations listed here.

III. Fruit exchange

One ripe plantain or one mango or about half a papaya.

For the light meal

Wheat porridge (12) or wheat-pulse "laddus" (13) or idli (14) or rawa idli (15) or idiappam with chutney powder (16) or puttu (17) or pongal (18) or wheat uppuma (19) or paniram (20) or maida dosai (21) or sundal (22) or vadai (23) or bajji or pakoda (24) or dosai (25) or ragi dosai (26) or fish cutlets (27) or tapioca-fish curry (28) or tapioca-fish dosai (29) or tapioca porridge (30) or tapioca- fish chappatis (31) or chops (32) or steamed puffs (33) or tapioca gulab jamun (34).

* The numerals within parentheses refer to the number in the list of recipes. For details regarding the preparation of these items, the list of recipes which follows may be consulted.

LIST OF RECIPES *

The recipes for the several items suggested in the exchange list are given below :

1. COOKED CEREAL OR TAPIOCA

| | gms. |
|---|------|
| Whole rice grains or powdered ragi, bajra, varagu, jowar, etc. ... | 180 |
| or Tapioca ... | 270 |

Method for Rice : Wash once or twice with minimal quantities of water; then boil in just sufficient water till cooked. *For other cereals* : The whole grains are pounded in a mortar till bran, husk, chaff, etc. are released ; winnowed free of bran etc. and the cleaned grain powdered and boiled in just sufficient water till cooked. *For tapioca* : The cleaned tapioca is cut into pieces, peeled free of the skin and boiled in sufficient water till soft.

2. ROTI

| | gms. |
|-------------------------|----------|
| Ragi or bajra flour ... | 180 |
| Hot water ... | 60 |
| Oil ... | 5 |
| Salt ... | to taste |

Method : The flour is mixed with salt, hot water is added gradually and kneaded for about five minutes. The kneaded dough is made into a ball and then into a small chappati with hand. It is then put onto a hot iron plate smeared with a little oil and is spread with the fingers. When cooked, the remaining oil is poured over the uncooked side, turned and cooked.

* Amount of ingredients are indicated in gms. 1 kg. = 1000 gm. "Rice" indicates parboiled rice and "oil" means groundnut oil.

WHEAT CHAPPATI

| | |
|----------------|---------|
| | gm |
| Wheat | ... 180 |
| Oil (optional) | ... 30 |
| Water | ... 90 |

Method : The wheat flour is kneaded into a dough with water. Small portion of the dough is made into chappati with rolling board and pin. It is placed on a hot iron plate (tawa) and the side is turned when slightly cooked. When both sides are slightly cooked it is roasted over burning charcoal. If oil is to be added, chappati should be rolled along with half-a-teaspoonful of oil and when one side is cooked, half-a-teaspoonful more of oil is added and the chappati is fried from both sides.

3. SAMBHAR

| | |
|---|------------------|
| | gms. |
| Red gram dhal | ... 30 |
| Vegetables | ... 30 |
| (Preferably leafy vegetables like drumstick leaves, amaranth, etc, or other vegetables like brinjals, cluster beans, etc.). | |
| Oil | ... 3 |
| Salt | ... to taste |
| Tamarind pulp | ... 5 |
| Sambhar masala | ... to taste |
| Mustard | ... a little |
| Curry leaves | ... a few leaves |
| Water | ... as required |

Method : The cleaned red gram dhal is boiled in water till it becomes very soft and all the water is absorbed. It is mashed and kept separate. The tamarind is soaked in 30 ml of water and an extract prepared. The vegetables are cooked separately in minimal amount of water; when soft, tamarind extract, pulse, curry leaves and other ingredients, except

mustard and oil are added. They are boiled to thick consistency. Mustard is fried in hot oil in a ladle or spoon and added to the sambhar.

Sambhar masala : Coriander seeds 240 g pepper 3 g cumin 4 g, Bengal gram 120 g, mustard 4 g, turmeric 4 g, red chillies 480 g, fenugreek seeds 4 g. asafoetida a little.

Method : All the ingredients are either dried in sun or are roasted on hot iron plate and ground into a fine powder.

4. VEGETABLE CHUTNEY

| | gm |
|-------------------------------|-------------|
| Mint or coriander or amaranth | ... 120 |
| Onion | ... 30 |
| Green chillies | . 4 |
| Tamarind or green mango | ... 4 |
| Oil (optional) | . 5 |
| Salt | .. to taste |

Method : The vegetables are washed and are ground in a grinding stone with the other ingredients. Ridgegourd, roasted brinjals with the skin removed may also be used as the vegetables. Sometimes, mustard fried in oil is added as a seasoning towards the end.

5. VEGETABLE SOUP

| | gm |
|-------------------|-----------------|
| Vegetable | ... 120 |
| Coconut | ... 15 |
| Onions | ... 15 |
| Dry chillies | 2 |
| Oil | ... 4 |
| Coriander seeds | ... a little |
| Cumin | ... a little |
| Curry leaves | ... a few |
| Garlic (optional) | ... a little |
| Mustard | ... a little |
| Water | ... as required |
| Salt | ... to taste |

Method : Vegetables are sliced and boiled in water till soft. All the spices along with coconut are roasted on hot iron plate, ground, added to the vegetables and cooked for a few minutes. Mustard, curry leaves (and garlic) are fried in oil and added.

6. PULSE CHUTNEY

| | gm |
|--|--------------|
| Roasted Bengal gram or groundnut or red gram dhal | ... 45 |
| Green chillies | ... 2 |
| Water | ... 15 |
| Tamarind | ... 5 |
| Oil | ... 3 |
| Mustard | ... a little |
| Curry leaves | ... a little |

Method : All the ingredients except mustard, oil and curry leaves are ground with water. The mustard, oil and curry leaves are fried in oil and added towards the end. A major part of the pulse (say 30 g) can be replaced by grated coconuts. This will then be known as pulse-coconut-chutney.

7. VEGETABLE KOOTU

| | gm |
|---|-----------------|
| Red gram dhal | ... 30 |
| Vegetables (pumpkin, yam, peas, brinjals, etc., or green leafy vegetables) | ... 60 |
| Coconut oil | ... 3 |
| Rasam masala | ... 2 |
| Coconut | ... 3 |
| Mustard | ... a little |
| Salt | ... to taste |
| Water | ... as required |

Method : Red gram is cooked separately in water and when soft, mashed properly. The cut vegetables are boiled in another vessel and mixed with dhal. Salt and rasam masala are added. After boiling for a few minutes, ground coconut is added. Mustard fried in oil is then added.

Rasam masala : Chillies—480 g. coriander seeds 240 g. pepper—60 g. cumin seeds—15 g. (Tur dhal—30 g, Bengal gram dhal—30 g. — optional) fenugreek seeds — 15 g. asafoetida—a little, turmeric—15 g. and oil—7 g. The chillies are fried in the oil and all the ingredients mixed and ground to a fine powder.

8. VEGETABLE CURRY

| | gm |
|-------------------------------|--------------|
| Vegetables | ... 120 |
| Onions | ... 15 |
| Oil | ... 3 |
| Water | ... 120 |
| Chillie powder | ... 2 |
| (if green chillies are used)— | ... 4 |
| Mustard | ... a little |
| Garlic (optional) | ... a little |
| Curry leaves | ... a little |
| Salt | ... to taste |

Method : To the fried mustard, mashed garlic and curry leaves are added. The vegetables and all other ingredients are added and cooked till the vegetables are soft and the water is absorbed.

9. PULSE SALAD (Kosumali)

| | gm |
|--------------------------------|--------------|
| Green gram or Bengal gram dhal | ... 30 |
| Green mango or lime | ... 30 |
| Coconut | ... 30 |
| Cucumber | ... 30 |
| Green chillies | ... 4 |
| Oil | ... 3 |
| Mustard | ... a little |
| Salt | ... to taste |

Method : The cleaned dhal is soaked in water for about two hours. Then it is washed properly so that the characteristic beany flavour is removed and then drained by putting in a wicker basket. The cut mango and cucumber along with grated coconut are added to it.

Salt to taste is then added. Mustard and chopped green chillies are fried in oil and added to the vegetable-dhal mixture. Instead of mango, lime juice may be used.

10. PULSE POWDER

| | gm |
|---------------|--------------|
| Red gram dhal | ... 30 |
| Red chillies | ... 2 |
| Oil | 4 |
| Salt | ... to taste |

Method : The dhal and chillies are fried over a shallow iron pan, cooled and pounded along with salt. It is served with oil. Instead of red gram dhal equal quantities of Bengal and black gram dhal can be used but in that case about 15 g. of fried and powdered coconut should be used. The dhals and the coconut should be fried separately, then mixed and pounded in a stone mortar. For the pulse powder, horse gram is also used by some people in addition to red gram dhal.

11. FISH CURRY

| | gm |
|--------------------|--------------|
| Fish | ... 90 |
| Coconut | ... 15 |
| Dried red chillies | ... to taste |
| Coriander seeds | ... a little |
| Cumin | ... a little |
| Salt | ... to taste |
| Turmeric | ... a pinch |
| Ginger | ... a little |
| Tamarind | ... a little |

Method : Fish is cleaned, cut into small pieces and boiled. Shred coconut, coriander, red chillies and cumin are roasted a little and ground with turmeric, garlic and tamarind. The ground mass with small pieces of ginger is mixed well with the cooked fish. Salt is added to taste and cooked for a few minutes more till a little gravy is left. Cooked tapioca can be eaten along with this fish curry.

12. WHEAT PORRIDGE

| | |
|--------------|-------------|
| | gm |
| Broken wheat | ... 90 |
| Green gram | ... 30 |
| Milk | ... 120 |
| Jaggery | ... 60 |
| Water | ... 960 ml. |

Method : Wheat is roasted in a pan. Green gram and 720 ml. of water are added to it. It is cooked till the grains are soft. The jaggery is mixed with 240 ml. of water, strained and is added. It is cooked till it is semi-solid. It is removed from the fire and hot milk added.

Note : Instead of jaggery a little of salt can be added, when it is being cooked and buttermilk may be added instead of milk.

13. WAEAT-PULSE "LADDUS"

| | |
|---------------------------|-----------------|
| | gm |
| Roasted Bengal gram flour | ... 30 |
| Roasted wheat flour | ... 30 |
| Jaggery powder | ... 15 |
| Water or milk as binder | ... as required |

Method : All the ingredients are mixed and made into small balls.

14. IDLI

| | |
|-----------------|--------------|
| | gm |
| Rice | ... 30 |
| Black gram dhal | ... 30 |
| Salt | ... to taste |
| Water | ... 90 ml |

Method : Rice and black gram dhal are soaked separately for 2 to 3 hours. They are then ground individually and mixed together to the proper consistency and kept overnight. Next day, salt is added to the thin dough and poured into the idli-moulds and cooked by steaming.

15. RAWA-IDLI

| | gm. |
|------------------|-----------------|
| Suji | ... 90 |
| Bengal gram dhal | ... 2 |
| Black gram dhal | ... 2 |
| Oil | ... 4 |
| Sour curd | ... 90 |
| Coriander leaves | ... a few |
| Curry leaves | ... a few |
| Mustard | ... a little |
| Salt | ... to taste |
| Water | ... as required |

Method : Seasoning is prepared with mustard, Bengal gram, black gram, curry leaves, coriander leaves and oil. Suji is then added and fried till slightly brown, cooled and mixed with curd, water and salt. The dough is poured in the idli-moulds and cooked by steaming till it sets. It is served with chutney prepared with roasted Bengal gram or groundnut and coconut.

16. IDIAPPAM

| | gm. |
|-------------|--------------|
| Wheat flour | ... 30 |
| Rice flour | ... 45 |
| Water | ... 180 ml |
| Salt | ... a little |

Method : All the ingredients are mixed and cooked on a low fire, stirring all the while. The dough is made into small balls and cooked in boiling water till they float. The balls are then passed through "sevai" press and served with jaggery and grated coconut or with lime and salt or with chutney powder.

CHUTNEY POWDER

| | gm. |
|------------------|-------------|
| Black gram dhal | 30 |
| Bengal gram dhal | ... 30 |
| Dried chillies | 30 |
| Oil | ... 2 |
| Salt | .. to taste |

Method : All the ingredients are fried and pounded in a stone mortar.

17. PUTTU

| | gm. |
|---------|--------|
| Rice | 60 |
| Jaggery | ... 60 |
| Water | 60 |
| Coconut | 4 |

Method : The cleaned rice is soaked in water for about two hours, then drained and air-dried. It is powdered and roasted on low fire till brown. The rice powder is mixed with jaggery syrup and grated coconut, packed in the puttu mould and steamed.

Puttu can also be prepared without admixture of jaggery syrup but then it is eaten with sambhar or chutney.

18. PONGAL

| | gm. |
|-----------------|--------------|
| Rice | ... 30 |
| Green gram dhal | ... 30 |
| Water | ... 250 ml. |
| Salt | ... to taste |

Method : The cleaned rice and dhal are cooked in water with salt till the grains are soft and the cooked material becomes semi-solid. Cumin fried in a little oil may be added towards the end.

19. WHEAT UPPUMA

| | gm |
|-----------------|-----------------|
| Broken wheat | ... 90 |
| Oil | ... 15 |
| Onions | ... 45 |
| Black gram dhal | ... 2 |
| Dried chillies | ... 4 |
| Mustard | ... a little |
| Curry leaves | ... a few |
| Salt | ... to taste |
| Water | ... as required |

Method : Mustard, chillies, curry leaves and dhal are fried in oil till brown. Then broken wheat is added and fried till brown. Water and salt are now added and mixed thoroughly. It is kept on low fire till cooked.

20. PANIARAM

| | gm |
|-----------------|-----------|
| Rice | ... 60 |
| Black gram dhal | ... 30 |
| Jaggery | ... 45 |
| Oil | ... 30 |
| Water | ... 90 ml |

Method : The rice and dhal are soaked overnight, but separately. Next day they are ground and kept for fermentation for about five hours. The jaggery powder is mixed with it and made into a thin dough. The dough in small portions is placed in the moulds of the Paniaram vessel and fried.

21. MAIDA DOSAI

| | gm |
|----------------|--------------|
| Wheat flour | ... 90 |
| Green chillies | ... 4 |
| Salt | ... to taste |
| Mustard | ... 2 |
| Ginger | ... 7 |
| Oil | ... 15 |
| Water | ... 200 ml |

Method : Chopped chillies, ginger and mustard are fried in 4 g of oil. The other ingredients are added. Water is then added gradually with stirring to a thin paste. Ladlefuls of the thin dough are poured over a hot iron plate smeared with oil, spread evenly and the dosai is cooked on both sides.

22. SUNDAL

| | gm |
|--|-----------------|
| Bengal gram (or green gram) (whole or dhal) | ... 30 |
| Green chillies | ... 4 |
| Oil | ... 4 |
| Coconut (grated or chopped) | ... 4 |
| Mustard | ... a little |
| Curry leaves | ... a few |
| Salt | ... to taste |
| Water | ... as required |

Method : The pulse is cleaned and soaked overnight. It is then cooked in water till the grains are soft. Salt is added and cooking continued for a few minutes more. Mustard, chopped green chillies, curry leaves and coconut are added after frying.

23. VADAI

| | gm |
|---|-----------------|
| Black gram or Bengal gram or Red gram dhal | ... 60 |
| Green chillies | ... 2 |
| Oil | ... 30 |
| Onion (optional) | ... 7 |
| Salt | ... to taste |
| Water | ... as required |

Method : The dhal is soaked in water overnight and ground properly. Chopped chillies, onions and salt are added and mixed thoroughly. Small portions of the dough are flattened with fingers and fried in deep fat.

24. BAJJI OR PAKODA

| | gm. |
|--|----------------|
| Bengal gram flour | ... 45 |
| Vegetable (plantain or brinjai or onion) | ... 90 |
| Oil (absorbed) | ... 15 |
| Chillie-powder | 2 |
| Salt | ... to taste |
| Water | .. as required |

Method: For Bajji: The Bengal gram flour, salt and chillie-powder are mixed and made into a thin paste with water. Sliced vegetables are dipped in the thin paste and fried in deep fat.

For Pakoda: For preparing pakodas the Bengal gram paste is made somewhat thicker and the vegetables are cut into small pieces and not sliced.

25. DOSAI

| | gm. |
|-----------------|-------------|
| Rice | ... 60 |
| Black gram dhal | ... 30 |
| Salt | .. to taste |
| Oil | ... 30 |
| Water | as required |

Method: Rice and dhal are soaked separately overnight and then ground properly. Salt and water are added to make a thin dough. The latter is kept aside for a few hours. Ladlefuls are spread evenly over a hot iron plate smeared with a little oil and cooked on both sides.

26. RAGI DOSAI

| | gm. |
|-----------------|-----------------|
| Ragi | ... 30 |
| Black gram dhal | .. 10 |
| Oil | 20 |
| Salt | .. to taste |
| Water | ... as required |

Method : Ragi and black gram dhal are soaked overnight but separately. They are then ground, and salt and water added to make a thin dough. It is kept aside for a few hours and dosais are prepared as mentioned earlier under Item 25.

27. FISH CUTLETS

| | gm. |
|------------------|--------------|
| Fish | ... 60 |
| Tapioca | ... 90 |
| Coconut (grated) | ... 10 |
| Oil | ... 10 |
| Salt | ... to taste |
| Green chillies | ... 10 |
| Coriander leaves | ... a little |

Method : Tapioca is peeled free of the skin and cooked properly. The cleaned and boiled fish is also mashed and added to it. The chopped chillies along with coriander and salt are added and mixed properly. Small portions of this mixture are flattened over the palm and shallowfried in oil till golden brown.

28. TAPIOCA FISH CURRY

| | gm. |
|-----------------|--------------|
| Fish | ... 60 |
| Tapioca | ... 90 |
| Grated coconut | ... 15 |
| Oil | ... 4 |
| Onion | ... 7 |
| Salt | ... to taste |
| Turmeric powder | ... a pinch |
| Mustard | ... a little |

Method : Fish is smeared with salt and turmeric and kept aside for about an hour. Tapioca is cut into small pieces and cooked in boiling water. The mustard is fried in oil, onions added and further fried. The fish cut in small pieces is cooked in water till most of the water is

absorbed and the pieces are soft. Boiled tapioca and grated coconut are now added and the whole cooked for two minutes after mixing well.

29. TAPIOCA-FISH DOSAI

| | gm. |
|-----------------|--------------|
| Tapioca powder | ... 30 |
| Black gram | ... 30 |
| Fish | ... 00 |
| Oil | ... 15 |
| Onions | ... 7 |
| Green chillies | ... to taste |
| Salt | ... to taste |
| Turmeric powder | .. a pinch |
| Mustard | ... a little |

Method: The black gram is soaked overnight and ground properly to a dough. It is mixed with powdered tapioca and salt and kept for a few hours to be fermented. Small pieces of fish with turmeric are cooked in water till soft, the mustard and chopped onions fried in about 4 g oil and salt are added. The black gram-tapioca mixture is made into a dough of dosai consistency. About a curryscoop of this mixture is poured over a greased tawa (iron plate) and cooked slightly from both sides. About a tablespoonful of the fish curry is placed inside the dosai which is cooked till golden brown.

30. TAPIOCA PORRIDGE (PAYASAM)

| | gm. |
|------------------|--------|
| Tapioca | ... 60 |
| Skim milk powder | ... 30 |
| Jaggery | ... 15 |
| Grated coconut | ... 15 |

Method: Cut pieces of tapioca are cooked in water till soft. They are mashed and cooked in milk prepared from milk powder. Jaggery and coconut are added and cooked for a few more minutes.

31. TAPIOCA-FISH CHAPPATIS

| | gm |
|------------------------|-----------------|
| Wheat flour | 45 |
| Chopped onions | ... 15 |
| Tapioca | ... 90 |
| Fish | ... 90 |
| Grated coconut | ... 30 |
| Oil | 15 |
| Salt | ... to taste |
| Chopped green chillies | ... as required |

Method: The tapioca and fish are boiled separately, minced and mixed properly. All the other ingredients except oil are also added and kneaded properly. Small portions of the dough are made into small chappatis with rolling board and pin and are fried with little oil over an iron plate.

32. CHOPS

| | gm. |
|------------------------------|--------------|
| Roasted Bengal gram powder | ... 30 |
| Fish | 60 |
| Tapioca | ... 90 |
| Oil | 15 |
| Grated coconut | ... 15 |
| Salt | ... to taste |
| Chillie-powder | ... to taste |
| Coriander powder | ... a pinch |
| Cloves powder | ... a pinch |
| Onions | ... a little |
| Garlic and ginger (optional) | ... a little |

Method: The tapioca is cooked and mashed. The fish is boiled with all the spices and mashed separately. Tapioca is mixed with roasted Bengal gram and salt and made into a dough. The cooked fish is stuffed into small flat balls of tapioca mixture and then these chops are fried in oil.

33. STEAMED PUFFS (KOLUKKATTAI)

| | gm |
|---------------------------|--------------|
| Fish | ... 45 |
| Tapioca | ... 90 |
| Skim milk powder | ... 21 |
| Coconut | ... 15 |
| Oil | ... 4 |
| Green coriander | ... a little |
| Chillie-powder | ... to taste |
| Gariic, ginger and onions | ... a little |
| Salt | ... to taste |

Method: Tapioca is boiled, mashed and mixed with a little salt and skim milk powder. The fish is cooked with all the spices and is mashed. It is fried in a little oil. Tapioca mash is rolled into small chapatis. A table-spoon of the fish mixture is enclosed inside the chapati, closed with the help of little water and cooked by steaming.

34. TAPIOCA GULAB JAMUN

| | gm |
|--------------------------|-------------------|
| Tapioca | ... 90 |
| Coconut | ... 15 |
| Skim milk powder | ... 30 |
| Oil | ... 10 |
| Jaggery | ... 30 |
| Water | ... as required |
| Baking powder (optional) | ... a small pinch |

Method: The tapioca is boiled, mashed and mixed with grated coconut and skim milk powder (and baking powder, if necessary). It is divided into several small balls, fried in oil till dark brown, then left immersed in hot jaggery syrup.



PART II

MENUS FOR MID-DAY MEALS AND SNACKS FOR
SCHOOL CHILDREN

INTRODUCTION

Objectives

From the nutritional standpoint, children of the school-going age constitute a highly vulnerable and important group. Extensive surveys carried out under the auspices of this Institute have indicated that such children suffer from different types of gross malnutrition and that their home diets are highly inadequate in many respects. Schemes for providing mid-day meals for school children have therefore, immense nutritional significance, specially in our country where malnutrition happens to be a serious clinical and public health problem.

Apart from the immediate practical value of combating malnutrition these schemes may also be used as a means of imparting nutrition education to the pupils. The schemes could be usefully employed to inculcate proper dietary habits in these children.

Principles

In formulating large - scale projects for providing mid-day meals for school children, certain broad principles have to be kept in mind. Firstly, the meals provided must be such as would supply atleast a third of the daily calorie requirement and about half of the daily protein requirement of the child. Secondly, the meals should not duplicate the ill-balanced diets to which these children are accustomed in their homes. Such duplication will not serve the objective of combating inadequacies in the home diets of these children. The meals should be so devised as to conform to accepted scientific principles and to offset the major deficiencies in the home diets of these children. Moreover, it is necessary to ensure that the cost per meal is kept within reasonable practical limits. Also the preparations should be such that they do not involve elaborate processing and cooking

which would not be feasible in most schools. The ingredients employed must, as far as possible, be locally available and not foreign to the people, the idea being that the children and their parents should eventually be in a position to improve their home diets on the lines of the mid-day meals. There should be daily variation in the menus so as to avoid tedium and monotony.

The present approach

In drawing up menus here, these principles have been adhered to as far as possible. With regard to children in South India, it is felt that supplying diets mostly based on rice will not be wholly successful in offsetting the general deficiencies in their home diets. In the first place, this procedure will not serve to educate these children in the habit of using cereals other than rice—a habit which has to be inculcated into them in their childhood. Secondly, providing a regular rice meal of the type they are used to at home, may result in cutting down of a corresponding portion of the home diets which the children would have otherwise normally taken. On the other hand, cutting out rice completely from the mid-day meals programmes for South Indian children may encounter considerable psychological resistance and may perhaps result in lack of co-operation from the communities and in a poor response to the programme. Therefore, a compromise has been attempted in the menus suggested herein. It is recommended that meals based on rice may alternate with or be used in combination with snacks based on non-rice cereals and foods rich in protein. The menus given here do not involve elaborate processing and cooking and are based mostly on ingredients locally available and acceptable to the people. It has been calculated that the cost of the various preparations would range from 10-60 paise. The tapioca-fish recipes are specially suitable for adoption in Kerala. The costing of the items has been made on the basis of the available information regarding price of fish in coastal Kerala. The above diets would supply about

350 to 570 calories and 13 to 32 g. protein. This would conform to the principle that at least a third of the daily calorie requirement and about half of the daily protein requirement must be met through the mid day meal.

Programme of feeding

The accompanying table (pp 30-32) shows the several menus with their calorie and protein value and cost along with the distinctive number of the recipes; details regarding the recipes appear in the following pages. The menus have been grouped under three heads : (1) Mid-day meals based on rice, wheat, millets or tapioca, (2) Mid-day snacks, and (3) meal-snack combinations.

The actual programme of feeding may be one of the following depending on the conditions that obtain locally.

1. Assuming a five-day week, the programme for the week can be as "Meal-snack-meal-snack-meal." This will provide three "meal days" and two "snack days" in a week. The several menus suggested for meals (Items I to VII) can be employed in rotation on "meal days" and the menus for snacks (Items VIII to XIX) on "snack days".

In order to provide a variety on "snack days" a list of combination snacks has been suggested under items XIV to XIX. The tedium and the monotony involved in consuming the same snack in the place of a meal will be avoided by this procedure. A sweet snack with a salt snack and a glass of butter-milk may be expected to be relished well.

2. The scheme suggested above is likely to encounter some psychological resistance on account of the fact that the fare offered on "snack days" may not be of the same filling value. From the nutritional angle, the snacks offer almost the same amount of calories, protein and diversity as the meal menus though they are less filling. The latter is hardly a drawback. For instance, a typical English lunch may be less filling than a rice meal but in no way less nutritious on that score.

To overcome possible objections from parents and others who may prefer a filling meal based on cereals, it may be desirable in the first instance, to provide meal-snack combinations on "snack days" instead of only snacks. This will result in three "meal days" and two "meal-snack-days" in which only part of the cereal is replaced by a nutritious snack. Such menus are listed under items XX to XXII in the table. Other suitable combinations of meal and snacks can be easily drawn up from list of menus for meals and snacks provided. Thus the problem has to be approached with considerable tact, caution and circumspection. It is desirable to avoid a rigid and dogmatic approach in this respect. The policy to be adopted will depend on the region, leadership and the resources.

General considerations

To ensure success in any large-scale programme of school feeding, it is obviously essential to secure co-operation from the officers of the Departments of Education, Health, Agriculture and Community Development working in the locality. In order to assess the benefits of the programme from the point of view of health and nutritional status of the pupils it will also be advisable for suitable officers of the Medical and Health Departments to undertake periodic health surveys of the pupils.

It is advised that where facilities permit, each school should have an adjoining plot of land which can be used for the purpose of rearing a kitchen garden. In this connection, the help of the agricultural authorities of the district will be required in the shape of supply of seeds, seedlings, fertilizers, and other ancillary help which will be useful in meeting the demands for the supply of vegetables needed for the mid-day meal programme.

The financial support necessary for the project may be considered under two heads: non-recurring expenditure towards providing equipment needed for cooking, and recurring expenditure for food materials, fuel and labour.

For psychological reasons, it is advisable that a portion of these expenses is met by the communities themselves. •This will ensure the active participation of the parents and a greater measure of co-operation and interest on their part in this scheme than would be the case if the entire expenses were defrayed by the Government. For instance, the scheme drawn up by the Madras Government in the early forties envisaged that the community would supply 4 P. per pupil while the State Government would contribute up to 6 p. This arrangement may be considered to be generally satisfactory. perhaps, however it would be necessary to provide for a total daily expenditure of about 40 paise to 1 Rupee per pupil to ensure supply of really adequate nutritious meals and snacks for the children.



MENUS FOR MID-DAY MEALS AND SNACKS FOR SCHOOL CHILDREN

| Menus* | Programme of feeding | Calories | Protein g. | Approximate cost ** P. |
|--|---|----------|------------|---------------------------|
| A. Mid-day meals | | | | |
| I. Rice or millet cooked (1) + sambhar(2) + buttermilk | For three days in a week. Meal not based on rice should be included on at least one of these three days.. | 550 | 15 | 43 |
| II. Pongal (3) + vegetable curry (4) + buttermilk | | 500 | 15 | 41 |
| III. Rice or millet cooked (1) + pulse chutney(5) + vegetable soup (6) + buttermilk. | | 550 | 15 | 41 |
| IV. Rice, cooked(1) + curds(7) + pickles(8) | | 500 | 16 | 32 |
| V. Tapioca, cooked(9) + fish curry (10) | | 500 | 32 | 40 |
| VI. Wheat pulse porridge (11) + buttermilk | | 450 | 14 | 31 |
| VII. Tapioca-fish chappatis (13) | | 500 | 21 | 41 |

B. MID-DAY SNACKS

| | | | | |
|-------|--|-----|----|----|
| VIII. | Wheat-pulse "laddus" (12) + buttermilk | 500 | 19 | 36 |
| IX. | Sundal (14) + buttermilk | 36 | 13 | 34 |
| X. | Toffee (15) + buttermilk | 410 | 20 | 46 |
| XI. | Biscuits (sweets and salt) (16a, b) + buttermilk | 420 | 20 | 54 |
| XII. | Tapioca-fish curry (17) | 440 | 18 | 37 |
| XIII. | Tapioca-fish dosai (18) | 420 | 30 | 51 |

For two days
in the week.

COMBINATION SNACKS

| | | | | |
|--------|---|-----|----|----|
| XIV. | Toffee (1/3 quantities prescribed in 15) + Sundal (14) + buttermilk | 500 | 20 | 47 |
| XV. | Biscuits, sweet (16a) + Sundal (14) + buttermilk | 570 | 23 | 82 |
| XVI. | Tapioca gulab jamuns (19) + steamed puffs (20) | 430 | 15 | 39 |
| XVII. | Tapioca gulab jamuns (19) + chops (21) | 550 | 19 | 41 |
| XVIII. | Tapioca porridge (22) + fish cutlets (23) | 420 | 19 | 79 |
| XIX. | Tapioca porridge (2/3 quantities prescribed in 22) + tapioca-fish curry (2/3 quantities prescribed in 17) | 510 | 24 | 65 |

Menus*

Programme of feeding Calories Protein g. Approximate cost ** P.

C. MEAL-SNACK COMBINATION

| | | | | |
|-------|--|-----|----|----|
| XX. | Rice or millet cooked (1) (from 60 g) + curds (7) + Sundal (half the quantities prescribed in 14) + buttermilk | | | |
| XXI. | Rice or millet cooked (1) (from 60 g) + Sambhar (2) + Toffee (1/3 quantities prescribed in 15) + buttermilk | 490 | 15 | 49 |
| XXII. | Rice or millet, cooked (1) (from 60 g) + Sambhar (2) + Biscuits (16a) + buttermilk | 450 | 15 | 50 |
| | | 520 | 19 | 85 |

For two days in the week to begin with, if items under Group B are not acceptable by themselves

The numerals within parentheses refer to the number in the list of recipes. The buttermilk may be derived from about 7 g of skim milk powder.

The Tapioca-fish recipes are specially suitable for adoption in Kerala. The costing of the items has been made on the basis of the available information regarding the price of fish in coastal Kerala.

** Cost based on prices prevailing in February 1977.

LIST OF RECIPES

1. COOKED CEREAL

| | |
|--|-----|
| | gm |
| Whole rice grains or powdered ragi, bajra, varagu, jowar, etc. | 100 |
| <i>Method :</i> As for item 1, Part 1, page 6. | |

2. SAMBHAR

| | |
|--|-------------|
| | gm |
| Redgram dhal or (cooked meat or fish or egg) | 20 |
| Groundnuts | 7 |
| Vegetables* | 60 |
| Oil | 4 |
| Salt | 4 |
| Tamarind pulp | 7 |
| Sambhar masala | 10 |
| Mustard | a little |
| Curry leaves | a few |
| Water | as required |
| <i>Method :</i> As for item 3. Part I, page 7. | |

3. PONGAL

| | |
|--|-------------|
| | gm |
| Rice | 90 |
| Green gram | 45 |
| Water | as required |
| Salt | to taste |
| <i>Method :</i> As for item 18, Part I, page 14. | |

4. VEGETABLE CURRY

| | |
|-----------------|----|
| | gm |
| Vegetables | 45 |
| Onions | 15 |
| Oil | 4 |

* In the list of recipes given here, vegetables will denote leafy vegetables like amaranath, drumstick leaves, etc., as far as practicable. If leafy vegetables are not available, brinjals, cluster beans, etc., may be used.

| | |
|---|-----------------|
| | gm. |
| Chillie-powder | ... 2 |
| (if green chillies are used) | ... 4 |
| Water | ... as required |
| Curry leaves | ... a little |
| Garlic (optional) | ... a little |
| Mustard | ... a little |
| <i>Method</i> : As for item 8, Part I, Page 10. | |

5. PULSE CHUTNEY

| | |
|---|--------------|
| | gm. |
| Roasted Bengalgram or groundnut or red gram dhal... | ... 30 |
| Green chillies | ... 2 |
| Water | ... 15 |
| Tamarind | ... 5 |
| Oil | ... 2 |
| Mustard | ... a little |
| Curry leaves | ... a little |
| Salt | ... to taste |
| <i>Method</i> : As for item 6, Part I, Page 9. | |

6. VEGETABLE SOUP

| | |
|--|-----------------|
| | gm. |
| Vegetables | ... 45 |
| Onions | ... 15 |
| Dry red chillies | ... 2 |
| Oil | ... 4 |
| Coriander seeds | ... a little |
| Cumin | ... a little |
| Curry leaves | ... a few |
| Garlic (optional) | ... a little |
| Mustard | ... a little |
| Water | ... as required |
| Salt | ... to taste |
| <i>Method</i> : As for item 5, Part I, Page 8. | |

7. | CURDS

Prepared from 20 gm of skim milk powder, diluted with water to about 120 ml.

8. PICKLES

Two or three pieces of mango or lime or amla pickle prepared in the usual way.

9. TAPIOCA COOKED

| | |
|-----------------|-----|
| | gm. |
| Tapioca (fresh) | 200 |

The washed tapioca is cut into small pieces, outer brown coat removed and cooked in boiling water till soft.

10. FISH CURRY

| | |
|--------------------|--------------|
| | gm. |
| Fish | 135 |
| Coconut | ... 20 |
| Dried red chillies | ... to taste |
| Coriander seeds | ... a little |
| Cumin | ... a little |
| Salt | ... to taste |
| Turmeric | ... a little |
| Ginger | ... a little |
| Tamarind | ... a little |

Method : As for item 11, Part I, Page 11,

11. WHEAT PULSE PORRIDGE

| | |
|--------------|-----------------|
| | gm. |
| Broken wheat | ... 60 |
| Green gram | ... 30 |
| Jaggery | ... 45 |
| Water | ... as required |

Method : Wheat is roasted in a pan, Green gram and 720 ml. of water are added to it. It is cooked till the grains are soft. The jaggery is mixed with 24 ml. of water, strained and is added. It is cooked till thick in consistency. It is removed from the fire. 60 ml of hot milk may be added, if available.

Note : Instead of jaggery a little of salt can be added, when it is being cooked and buttermilk may be added instead of milk.

12. WHEAT-PULSE "LADDUS"

| | gm. |
|---------------------------|-----------------|
| Roasted Bengal gram flour | ... 60 |
| Roasted wheat flour | ... 60 |
| Jaggery powder | ... 30 |
| Water or milk as binder | ... as required |

Method : All ingredients are mixed and made into small balls.

13. TAPIOCA-FISH CHAPPATIS

| | gm. |
|------------------------|-----------------|
| Wheat flour | ... 35 |
| Chopped onions | ... 15 |
| Tapioca | ... 75 |
| Fish | ... 60 |
| Grated coconut | ... 20 |
| Oil | ... 10 |
| Salt | ... to taste |
| Chopped green chillies | ... as required |

Method : As for item 31, Part 1, Page 20.

14. SUNDAL

| | gm. |
|--|-----------------|
| Bengal gram (or green gram) (Whole or dhal) | ... 60 |
| Green chillies | ... 4 |
| Oil | ... 7 |
| Coconut (grated or chopped) | ... 20 |
| Mustard | ... a little |
| Curry leaves | ... a few |
| Salt | ... to taste |
| Water | ... as required |

Method : As for item 22, Part I, Page 16.

15. TOFFEE

| | gm. |
|----------------------------|-----------------|
| Roasted Bengal gram powder | ... 15 |
| Roasted groundnut powder | ... 15 |
| Jaggery powder | ... 20 |
| Skim milk powder | ... 30 |
| Grated coconuts | ... 20 |
| Water | ... as required |

Method : The jaggery is made into a syrup with boiling water, the other ingredients are added to it, mixed properly and the whole spread evenly over a plate and cut into small cubes.

16. (a). BISCUITS (sweet)

| | gm. |
|----------------------------|-------------|
| Roasted Bengal gram powder | 15 |
| Roasted Groundnut powder | ... 15 |
| Wheat flour | ... 20 |
| Skim milk powder | ... 20 |
| Jaggery powder | ... 20 |
| Oil | ... 5 |
| Baking powder | ... a pinch |

16. (b). BISCUITS (salted)

| | gm. |
|----------------------------|--------------|
| Roasted Bengal gram powder | ... 15 |
| Roasted groundnut powder | ... 15 |
| Wheat flour | ... 45 |
| Skim milk powder | ... 20 |
| Oil | ... 5 |
| Salt | ... to taste |
| Baking powder | ... a pinch |

Method : All the ingredients are mixed and made into a hard dough with water. The dough is divided into small portions and each portion is rolled into a thin piece. The pieces are then baked over a hot iron plate till slightly golden brown. The biscuits may be prepared in a bakery if facilities are available.

Note : For sweet biscuits the jaggery is dissolved in water, strained and the dough is made with this jaggery solution.

17. TAPIOCA-FISH CURRY

| | gm. |
|-----------------|----------|
| Fish | 90 |
| Tapioca | 135 |
| Grated coconut | 20 |
| Oil | 7 |
| Onions | 7 |
| Salt | to taste |
| Turmeric powder | a pinch |
| Mustard | a little |

Method : As for item 28, Part I, page 18.

18. TAPIOCA-FISH DOSAI

| | gm. |
|-----------------|----------|
| Tapioca powder | 35 |
| Black gram dhal | 35 |
| Fish | 120 |
| Oil | 15 |
| Onions | 15 |
| Green chillies | to taste |
| Salt | to taste |
| Turmeric powder | a pinch |
| Mustard | a little |

Method : As for item 29, Part I, Page 19.

19. TAPIOCA GULAB JAMUN

| | gm. |
|--------------------------|-------------|
| Tapioca | 65 |
| Coconut | 10 |
| Skim milk powder | 7 |
| Oil | 7 |
| Jaggery | 20 |
| Baking powder (optional) | a pinch |
| Water | as required |

Method : As for item 34, Part I, Page 21.

20. STEAMED PUFFS

| | gm. |
|------------------|--------------|
| Fish | ... 21 |
| Tapioca | ... 45 |
| Skim milk powder | ... 10 |
| Coconut | ... 7 |
| Oil | ... a little |
| Chillie-Powder | ... to taste |
| Salt | ... to taste |
| Coriander leaves | ... a few |
| Garlic | ... a little |
| Ginger | ... a little |
| Onions | ... a little |

Method : As for item 33, Part I, Page 21.

21. CHOPS

| | gm. |
|------------------------------|--------------|
| Roasted Bengal gram powder | ... 15 |
| Fish | ... 30 |
| Tapioca | ... 40 |
| Oil | ... 7 |
| Grated coconut | ... 15 |
| Salt | ... to taste |
| Chillie-powder | ... to taste |
| Coriander | ... a little |
| Cloves powder | ... a little |
| Onions | ... a little |
| Garlic and ginger (optional) | ... a little |

Method : As for item 32, Part I, page 20

22. TAPIOCA-PORRIDGE

| | gm. |
|------------------|--------|
| Tapioca | ... 90 |
| Skim milk powder | ... 45 |
| Jaggery | ... 20 |
| Grated coconut | ... 20 |

Method : As for item 30, Part I, Page 19.

23. FISH CUTLETS

| | gm. |
|------------------|--------------|
| Fish | ... 35 |
| Tapioca | ... 60 |
| Grated coconut | ... 7 |
| Oil | ... 7 |
| Salt | ... to taste |
| Green chillies | ... to taste |
| Coriander leaves | ... a few |

Method : As for item 27, Part I, page 18.



